PATENT ABSTRACTS OF JAPAN

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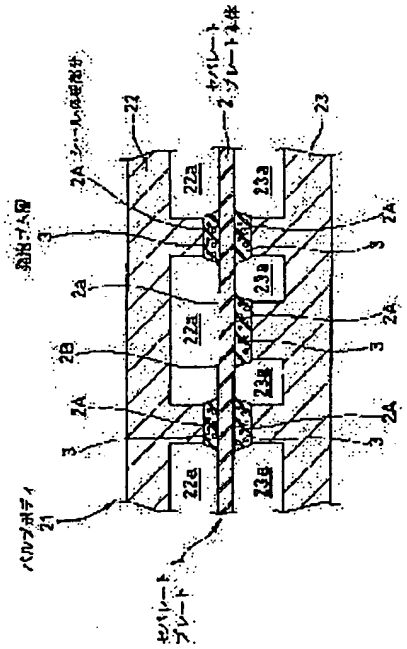
(54) SEPARATE PLATE AND MANUFACTURE THEREOF

(57)Abstract:
PROBLEM TO BE SOLVED: To make manufacture relatively easy and cost-advantageous and to prevent generation of a rubber burr by coating only a part required to seal a separate plate body with a foaming rubber layer by using a dispenser coating method or a screen coating method.
SOLUTION: A separate plate 1 has a basic plane layout to be installed on a valve body 21 of an automatic transmission, and upper/lower both surfaces of a steel-made separate plate body 2 are respectively coated with a foaming rubber layer 3 as a seal layer. Only a part 2A required to seal the separate plate body 2 is coated with the foaming rubber layer by a dispenser coating method or a screen coating method. Accordingly, the whole part 2B unnecessary for sealing is not coated with the foaming rubber layer 3 from the beginning of manufacture, rubber removing work is not needed on the part 2B, manufacture is facilitated, and a working expense can be reduced.



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CLAIMS

[Claim(s)]
[Claim 1] The separate plate characterized by coating only a part (2A) required for a seal with said foamed rubber layer (3) using a dispenser coating method or a screen coating method in the separate plate (1) which put the foamed rubber layer (3) on both sides or one side of the body of a separate plate (2) while the valve body (21) of an automatic transmission was equipped.
[Claim 2] In the separate plate (1) which put the foamed rubber layer (3) on both sides or one side of the body of a separate plate (2) while the valve body (21) of an automatic transmission was equipped While coating said body of a separate plate (2) with said foamed rubber layer (3) according to the configuration of a land (22b) (23b) prepared in said valve body (21) The separate plate characterized by coating said body of a separate plate (2) with said foamed rubber layer (3) by width of face larger than the width of face of said land (22b) (23b).
[Claim 3] The manufacture approach of the separate plate characterized by coating only a part (2A) required for a seal with said foamed rubber layer (3) using a dispenser coating method or a screen coating method in the approach of manufacturing the separate plate (1) which put the foamed rubber layer (3) on both sides or one side of the body of a separate plate (2) while the valve body (21) of an automatic transmission was equipped.
[Claim 4] In the approach of manufacturing the separate plate (1) which put the foamed rubber layer (3) on both sides or one side of the body of a separate plate (2) while the valve body (21) of an automatic transmission was equipped While coating said body of a separate plate (2) with said foamed rubber layer (3) according to the configuration of a land (22b) (23b) prepared in said valve body (21) The manufacture approach of the separate plate characterized by coating said body of a separate plate (2) with said foamed rubber layer (3) by width of face larger than the width of face of said land (22b) (23b).

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] It relates to the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate which is a substrate, and its manufacture approach while the valve body of an automatic transmission (AT) is equipped with this invention.
[0002]
[Description of the Prior Art] The valve body of an automatic transmission is equipped with the separate plate as it is put between the valve bodies divided into two, and as shown in drawing 8 , this separate plate 1 puts the foamed rubber layer 3 on both sides or one side (drawing both sides) of the body 2 of a separate plate made from steel materials which is a substrate.
[0003] There is a function as a receptacle seat which receives the spring of an accumulator, the ball of a ball check valve, etc. other than the seal function which carries out the seal of between the valve bodies divided into two to the separate plate 1 for these automatic transmissions, as only this part was shown in this drawing about the part which functions as this receptacle seat, the foamed rubber layer 3 is removed, and the hard body 2 of a separate plate is carrying out surface exposure.
[0004] However, in order to form this surface exposure partial 2a conventionally, after putting the foamed rubber layer 3 all over the body 2 of a separate plate, garbage 3a of the foamed rubber layer 3 is removed by the water jet method or the milling cutter method, uniform removal is difficult for these approaches, and processing is complicated to them, they take much time and effort and time amount, and there is un-arranging with still higher cost in them.
[0005] Moreover, although this layered product is pierced by press working of sheet metal to the product configuration after facing manufacturing the above-mentioned separate plate 1, putting the foamed rubber layer 3 all over the steel plate which forms the body 2 of a separate plate and fabricating a layered product, rubber weld flash occurs in the periphery section of the separate plate 1, and the hole periphery section by press working of sheet metal, and there is un-arranging [whose rubber weld flash of this flows out in a valve body as a foreign matter, and causes trouble to actuation of a bulb].
[0006]
[Problem(s) to be Solved by the Invention] This invention aims at offering the separate plate which can demonstrate the seal function which was excellent again for the purpose of offering the separate plate which manufacture is comparatively easy, is advantageous also in cost, and rubber weld flash does not generate in view of the above point, and its manufacture approach in addition to this, and its manufacture approach.
[0007]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, it is characterized by coating only a part required for a seal with said foamed rubber layer using a dispenser coating method or a screen coating method in the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission is equipped with the separate plate by claim 1 of this invention.

[0008] Moreover, in the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission was equipped, the separate plate by claim 2 of this invention is characterized by coating said body of a separate plate with said foamed rubber layer by width of face larger than the width of face of said land while it coats said body of a separate plate with said foamed rubber layer according to the configuration of a land prepared in said valve body.
[0009] Moreover, it is characterized by coating only a part required for a seal with said foamed rubber layer using a dispenser coating method or a screen coating method in the manufacture approach of the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission is equipped with the manufacture approach of the separate plate by claim 3 of this invention.
[0010] Moreover, the manufacture approach of the separate plate by claim 4 of this invention In the approach of manufacturing the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission was equipped While coating said body of a separate plate with said foamed rubber layer according to the configuration of a land prepared in said valve body, it is characterized by coating said body of a separate plate with said foamed rubber layer by width of face larger than the width of face of said land.
[0011] If only a part required for the seal of the body of a separate plate is coated with foamed rubber with a dispenser coating method or a screen coating method, since the part which coats foamed rubber will be limited only to a part required for a seal like the separate plate by claims 1 or 3 of this invention equipped with the above-mentioned configuration, or its manufacture approach, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part made into the receptacle seat to a spring, a ball, etc.
[0012] Moreover, since it is an approach suitable for a dispenser coating method or a screen coating method performing coating only to a request part among the flat surfaces for coating . Foamed rubber is coated after press working of sheet metal by these approaches (after carrying out press working of sheet metal of the ingredient steel plate and considering as the product configuration as a body of a separate plate). the predetermined part of this body of a separate plate -- foamed rubber -- coating -- Or foamed rubber is coated so that foamed rubber may not start a press end face (press cutting plane) (on the flat surface of an ingredient steel plate). After coating only a predetermined part with foamed rubber so that foamed rubber may not start the part which serves as a press end face (press cutting plane) behind (after) press working of sheet metal of this ingredient steel plate is carried out, and it considers as the product configuration as a body of a separate plate -- things enable it to prevent that rubber weld flash occurs at the time of press working of sheet metal of an ingredient steel plate.
[0013] moreover, like the separate plate by claims 2 or 4 of this invention equipped with the above-mentioned configuration, or its manufacture approach If the body of a separate plate is coated with a foamed rubber layer according to the configuration (land configuration) of a land prepared in the valve body Since the part which coats foamed rubber is limited to the part according to the configuration of a land, i.e., a part required for a seal, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part too made into the receptacle seat to a spring, a ball, etc. A land is the convex contact section thru/or the convex press section to the separate plate beforehand prepared in a valve body thru/or its housing.
[0014] Moreover, it combines, and since coating of the foamed rubber layer is carried out to the body of a separate plate in the separate plate by these claims 2 or 4, or its manufacture approach by width of face larger than the width of face (land width) of a land, rubber thickness of a part which a land contacts can be made into homogeneity. Therefore, local concentration of planar pressure is avoidable, and by preparing outside the part which is not concluded by the valve body (housing), the flow to the outside of conclusion rubber can be suppressed and it becomes possible destruction of a rubber layer, and to overflow and to prevent peeling etc. Moreover, the climax part of the rubber of the part which is not put between a valve body (housing) at it and coincidence does so the operation which closes a leak path, and it becomes possible to raise the seal engine performance of it by this therefore.

[0015]
[Embodiment of the Invention] The operation gestalt of this invention is explained according to a drawing below.
[0016] Drawing 1 shows the flat surface of the separate plate (it is also called the gasket for valve bodies) 1 concerning the operation gestalt concerned, and the important section enlarged section is shown in drawing 2 . Moreover, drawing 3 is the sectional view of a wearing condition.
[0017] The separate plate 1 concerning the operation gestalt concerned As it first has the flat-surface layout fundamental as that with which the valve body 21 (refer to drawing 3) of an automatic transmission is equipped as shown in drawing 1 , and shown in drawing 2 The foamed rubber layer 3 is put on vertical both sides of the body 2 of a separate plate made from steel materials as a sealing layer, respectively. Only within partial (seal need part) 2A required for the seal of the body 2 of a separate plate, coating of this foamed rubber layer 3 is carried out by the dispenser coating method or the screen coating method. Therefore, no coating of the foamed rubber layer 3 is carried out to seal garbage 2B from the beginning of manufacture including the part which functions as a receptacle seat which receives the spring of an accumulator, or the ball of a ball check valve, but this seal garbage 2B is set to perfect surface exposure partial 2a from the beginning.
[0018] As shown in drawing 3 , the valve body 21 equipped with the separate plate 1 is divided into two upper and lower sides, has the up-and-down housing 22 and 23, and is formed in the inferior surface of tongue of the top housing 22, and the top face of the bottom housing 23 oilway 22a which circulates oil pressure, and in the shape of a 23a fang furrow, respectively. Therefore, the separate plate 1 will be put between the inferior surface of tongue of the top housing 22 which serves as a convex of duality by formation of these oilways 22a and 23a, and the top face of the bottom housing 23, and the part which contacts the inferior surface of tongue of the top housing 22 or the top face of the bottom housing 23 in vertical each side of the separate plate 1 is set to seal need partial 2A. Therefore, the above-mentioned foamed rubber layer 3 will be formed with the layout substantially reversed to the layout of Oilways 22a and 23a. Moreover, with the top housing 22 and the bottom housing 23, since it is general that the layouts of Oilways 22a and 23a differ mutually, superficial layouts will differ in the foamed rubber layer 3 by which coating is carried out to the top face of the body 2 of a separate plate, and the foamed rubber layer 3 by which coating is carried out to an inferior surface of tongue.
[0019] Many cellular rooms (it is also called cellular space) 4 are formed in the interior of the foamed rubber layer 3, respectively, and the foamed rubber layer 3 is especially equipped with big elasticity thru/or stretch nature by existence of this cellular room 4.
[0020] It faces manufacturing the separate plate 1 of the above-mentioned configuration. The body 2 of a separate plate is alone pierced by the press to a product configuration. After this press working of sheet metal [whether only seal need partial 2A is coated with the foamed rubber layer 3 with a dispenser coating method or a screen coating method, and] The part which becomes seal need partial 2A of the separate plate 1 on the contrary behind (after) among the steel plates which form the body 2 of a separate plate is coated with the foamed rubber layer 3 with a dispenser coating method or a screen coating method. Or after this coating It carries out whether said steel plate is pierced with a press to a product configuration, and especially in the case of the latter, it takes care so that the foamed rubber layer 3 may not start the press end face which serves as the periphery section of the separate plate 1, or the hole periphery section at the time of coating.
[0021] The dispenser coating method which coats the foamed rubber layer 3 only within seal need partial 2A of the body 2 of a separate plate performs coating to seal need partial 2A of the body 2 of a separate plate using a dispenser system. When it has the basic configuration of a tank 32, the regurgitation bulb 33, and controller 34 grade and uses this by this invention, this dispenser system 31 covers predetermined width of face and predetermined height, and carries out the regurgitation of nozzle 33a at bulb 33 tip to the foamed rubber to band-like, so that it may illustrate to drawing 4 .
[0022] Moreover, a screen coating method performs coating to seal need partial 2A, where a screen is set as seal garbage 2B of the body 2 of a separate plate, and any approach is an

approach suitable for performing coating only to a request part among the flat surfaces for coating, and it has the description that the coating activity is easy.
[0023] The separate plate 1 and its manufacture approach of the above-mentioned configuration do the following operation effectiveness so.
[0024] That is, since no coating of the foamed rubber layer 3 is first carried out in the first place from the beginning of manufacture at seal garbage 2B of the body 2 of a separate plate, an exposure can form perfect and uniform surface exposure partial 2a. Moreover, since it is the same and rubber removal processing is unnecessary entirely about seal garbage 2B, manufacture of the separate plate 1 can be easy-ized and floor to floor time and conversion costs can be reduced.
[0025] Moreover, it can prevent that rubber weld flash occurs at the time of press working of sheet metal by coating the foamed rubber layer 3 so that the foamed rubber layer 3 may be coated after press working of sheet metal or the foamed rubber layer 3 may not start a press end face. Therefore, it can prevent that rubber weld flash flows out in a valve body 21 as a foreign matter, and causes trouble to actuation of a bulb.
[0026] Moreover, it can prevent that setting generates the foamed rubber layer 3 by bolting around the insertion hole (neither is illustrated) of the clamping bolt prepared in the separate plate 1 at the foamed rubber layer 3 when making it there be no ****. Therefore, it can prevent that slack occurs in a clamping bolt by considering setting of the foamed rubber layer 3 as a cause, and can prevent that seal nature falls by considering the slack of a clamping bolt as a cause.
[0027] Moreover, a coating activity is easy-ized by adoption of a dispenser coating method or a screen coating method, and necessary minimum width of face and coating of height become possible. Moreover, the amount of the rubber used is also stopped few. Therefore, easy-izing of manufacture and low cost-ization of a product are realizable with reduction of such the easy coating method and the easy amount of the rubber used.
[0028] The part which serves as a convex of duality by forming Oilways 22a and 23a in the inferior surface of tongue of the top housing 22 in the valve body 21 which puts the separate plate 1, and the top face of the bottom housing 23, respectively as described above If this is the so-called lands 22b and 23b as shown in drawing 5 , and based on these lands 22b and 23b, in this invention While coating of the foamed rubber layer 3 is carried out to the body 2 of a separate plate according to the configuration (a flat-surface configuration thru/or flat-surface layout configuration) of these lands 22b and 23b by the same configuration thru/or same pattern as these lands 22b and 23b Width of face w1 of these lands 22b and 23b Large width of face w2 Coating of the foamed rubber layer 3 is carried out to the body 2 of a separate plate (w1 <w2).
[0029] The difference of the width of face of lands 22b and 23b and the foamed rubber layer 3 Right-and-left one side is enough if there is 0.25mm or more by the absolute size (/(w2-w1) 2> 0.25mm). for example, the case where thickness (rubber thickness) t of the foamed rubber layer 3 is 100 micrometers -- width of face (rubber coat ****) w2 of the foamed rubber layer 3 Width of face (partner sealing-surface width of face) w1 of lands 22b and 23b 2mm (every 1mm of one side) extent -- that what is necessary is just greatly (w2-w1 **2mm) Thus, width of face w2 of the foamed rubber layer 3 Width of face w1 of lands 22b and 23b If it enlarges Since flat section (part with flat top-face or inferior surface of tongue) 3b of the center of the cross direction in the foamed rubber layer 3 is compressed by lands 22b and 23b to be shown in drawing 6 , the planar pressure by compression can equalize crosswise and, therefore, can stabilize seal nature.
[0030] Moreover, as shown in drawing 6 , the crosswise edge of the foamed rubber layer 3 overflows lands 22b and 23b into right and left, respectively. In order to be pushed on the pressure P of a sealing fluid and to press flat section 3b from right-and-left both sides instead of forming the part which is not compressed into lands 22b and 23b, these right and left overflowing, and section 3c being compressed into lands 22b and 23b, respectively this -- it will overflow and flat section 3b will support from right and left by section 3c. Therefore, even if flat section 3b is compressed by lands 22b and 23b, it does not escape crosswise recklessly, but the rubber seal section excellent in compressibility-proof is formed here. Therefore, thereby, the seal nature of the separate plate 1 concerned can be raised.

[0031] In addition, generally, as shown in drawing 5 , when, as for the cross-section configuration of the foamed rubber layer 3 by coating, this foamed rubber layer 3 has the width of face more than a certain extent, although that thickness is abbreviation homogeneity and that top face or inferior surface of tongue becomes a flat, that crosswise center section A crosswise edge on either side is formed, respectively so that the thickness may be missing from an edge and may become thin gradually, among these as described above, flat section 3b with flat top face or inferior surface of tongue does a seal operation so effectively directly. Therefore, width of face w3 of this flat 3b Width of face w1 of lands 22b and 23b By making it approximate, the seal nature of the separate plate 1 can be raised, and it is the width of face w3 of this flat section 3b. Width of face w1 of lands 22b and 23b The seal engine performance of the separate plate 1 can be further raised by setting up greatly.
[0032] Drawing 7 was the following conditions, is what compared the difference of the amount of leaks the case where width of face of the foamed rubber layer 3 is set to 3mm, and at the time of being referred to as 3.5mm, and was able to check that there was little one where width of face is larger about the amount of leaks (the especially low-pressure amount of leaks).
[0033] a test condition ... test piece: -- a foamed rubber coat article (coat **** differences [two sorts of] 3 or 3.5mm)
partner sealing-surface width-of-face (land width): -- 3mm planar pressure: -- 1.5, 2.0, and 2.5MPa seal fluid:ATF oil 1.0MPa (regularity)
[0034]
[Effect of the Invention] This invention does the following effectiveness so.
[0035] Namely, it sets first to the separate plate by claims 1 or 3 or its manufacture approach of this invention equipped with the above-mentioned configuration. Coating of the foamed rubber is carried out only to a part required for the seal of the body of a separate plate by the dispenser coating method or the screen coating method. Since the part which coats foamed rubber is limited only to a part required for a seal, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part made into the receptacle seat to a spring, a ball, etc. Therefore, an exposure can form a perfect and uniform surface exposure part in the body of a separate plate. Moreover, since it is the same and rubber removal processing is unnecessary entirely about a seal garbage, manufacture of a separate plate can be easy-ized and floor to floor time and conversion costs can be reduced.
[0036] Moreover, it sets to the separate plate by claims 2 or 4 or its manufacture approach of this invention equipped with the above-mentioned configuration. According to the configuration of a land prepared in the valve body, coating of the foamed rubber layer is carried out to the body of a separate plate. Since the part which coats foamed rubber is limited to the part according to the configuration of a land, i.e., a part required for a seal Coating of the foamed rubber will be carried out to a seal garbage from the beginning of manufacture including the part too made into the receptacle seat to a spring, a ball, etc. Therefore, an exposure can form a perfect and uniform surface exposure part in the body of a separate plate. Moreover, since it is the same and rubber removal processing is unnecessary entirely about a seal garbage, manufacture of a separate plate can be easy-ized and floor to floor time and conversion costs can be reduced.
[0037] Moreover, it can prevent that rubber weld flash occurs at the time of press working of sheet metal by coating a foamed rubber layer so that a foamed rubber layer may be coated after press working of sheet metal or a foamed rubber layer may not start a press end face as a place which is common in each claim. Therefore, it can prevent beforehand that rubber weld flash flows out in a valve body as a foreign matter, and causes trouble to actuation of a bulb.
[0038] Moreover, it can prevent that setting generates a foamed rubber layer by bolting around the insertion hole of the clamping bolt prepared in a separate plate at a foamed rubber layer when making it there be no ****. Therefore, it can prevent that slack occurs in a clamping bolt by considering setting of a foamed rubber layer as a cause, and can prevent that seal nature falls by considering the slack of a clamping bolt as a cause.
[0039] Moreover, a coating activity is easy-ized by adoption of a dispenser coating method or a screen coating method, and necessary minimum width of face and coating of height become

possible. Moreover, the amount of the rubber used is also stopped few. Therefore, easy-izing of manufacture and low cost-ization of a product are realizable with such an easy coating method and reduction of the amount of the rubber used.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] It relates to the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate which is a substrate, and its manufacture approach while the valve body of an automatic transmission (AT) is equipped with this invention.

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PRIOR ART

[Description of the Prior Art] The valve body of an automatic transmission is equipped with the separate plate as it is put between the valve bodies divided into two, and as shown in drawing 8 , this separate plate 1 puts the foamed rubber layer 3 on both sides or one side (drawing both sides) of the body 2 of a separate plate made from steel materials which is a substrate.
[0003] There is a function as a receptacle seat which receives the spring of an accumulator, the ball of a ball check valve, etc. other than the seal function which carries out the seal of between the valve bodies divided into two to the separate plate 1 for these automatic transmissions, as only this part was shown in this drawing about the part which functions as this receptacle seat, the foamed rubber layer 3 is removed, and the hard body 2 of a separate plate is carrying out surface exposure.
[0004] However, in order to form this surface exposure partial 2a conventionally, after putting the foamed rubber layer 3 all over the body 2 of a separate plate, garbage 3a of the foamed rubber layer 3 is removed by the water jet method or the milling cutter method, uniform removal is difficult for these approaches, and processing is complicated to them, they take much time and effort and time amount, and there is un-arranging with still higher cost in them.
[0005] Moreover, although this layered product is pierced by press working of sheet metal to the product configuration after facing manufacturing the above-mentioned separate plate 1, putting the foamed rubber layer 3 all over the steel plate which forms the body 2 of a separate plate and fabricating a layered product, rubber weld flash occurs in the periphery section of the separate plate 1, and the hole periphery section by press working of sheet metal, and there is un-arranging [whose rubber weld flash of this flows out in a valve body as a foreign matter, and causes trouble to actuation of a bulb].

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EFFECT OF THE INVENTION

[Effect of the Invention] This invention does the following effectiveness so.
[0035] That is, it sets first to the separate plate by claims 1 or 3 or its manufacture approach of this invention equipped with the above-mentioned configuration, and they are a dispenser coating method or a screen coating method. Coating of the foamed rubber is carried out only to a part required for the seal of the body of a separate plate, and since the part which coats foamed rubber is limited only to a part required for a seal, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part made into the receptacle seat to a spring, a ball, etc. Therefore, an exposure can form a perfect and uniform surface exposure part in the body of a separate plate. Moreover, since it is the same and rubber removal processing is unnecessary entirely about a seal garbage, manufacture of a separate plate can be easy-ized and floor to floor time and conversion costs can be reduced.
[0036] Moreover, set to the separate plate by claims 2 or 4 or its manufacture approach of this invention equipped with the above-mentioned configuration. According to the configuration of a land prepared in ** and a valve body, coating of the foamed rubber layer is carried out to the body of a separate plate, and since the part which coats foamed rubber is limited to the part according to the configuration of a land, i.e., a part required for a seal, coating of the foamed rubber will be carried out to a seal garbage from the beginning of manufacture including the part too made into the receptacle seat to a spring, a ball, etc. Therefore, an exposure can form a perfect and uniform surface exposure part in the body of a separate plate. Moreover, since it is the same and rubber removal processing is unnecessary entirely about a seal garbage, manufacture of a separate plate can be easy-ized and floor to floor time and conversion costs can be reduced.
[0037] Moreover, it can prevent that rubber weld flash occurs at the time of press working of sheet metal by coating a foamed rubber layer so that a foamed rubber layer may be coated after press working of sheet metal or a foamed rubber layer may not start a press end face as a place which is common in each claim. Therefore, it can prevent beforehand that rubber weld flash flows out in a valve body as a foreign matter, and causes trouble to actuation of a bulb.
[0038] Moreover, it can prevent that setting generates a foamed rubber layer by bolting around the insertion hole of the clamping bolt prepared in a separate plate at a foamed rubber layer when making it there be no ****. Therefore, it can prevent that slack occurs in a clamping bolt by considering setting of a foamed rubber layer as a cause, and can prevent that seal nature falls by considering the slack of a clamping bolt as a cause.
[0039] Moreover, a coating activity is easy-ized by adoption of a dispenser coating method or a screen coating method, and necessary minimum width of face and coating of height become possible. Moreover, the amount of the rubber used is also stopped few. Therefore, easy-izing of manufacture and low cost-ization of a product are realizable with such an easy coating method and reduction of the amount of the rubber used.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention aims at offering the separate plate which can demonstrate the seal function which was excellent again for the purpose of offering the separate plate which manufacture is comparatively easy, is advantageous also in cost, and rubber weld flash does not generate in view of the above point, and its manufacture approach in addition to this, and its manufacture approach.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, it is characterized by coating only a part required for a seal with said foamed rubber layer using a dispenser coating method or a screen coating method in the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission is equipped with the separate plate by claim 1 of this invention.
[0008] Moreover, in the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission was equipped, the separate plate by claim 2 of this invention is characterized by coating said body of a separate plate with said foamed rubber layer by width of face larger than the width of face of said land while it coats said body of a separate plate with said foamed rubber layer according to the configuration of a land prepared in said valve body.
[0009] Moreover, it is characterized by coating only a part required for a seal with said foamed rubber layer using a dispenser coating method or a screen coating method in the manufacture approach of the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission is equipped with the manufacture approach of the separate plate by claim 3 of this invention.
[0010] Moreover, the manufacture approach of the separate plate by claim 4 of this invention In the approach of manufacturing the separate plate which put the foamed rubber layer on both sides or one side of the body of a separate plate while the valve body of an automatic transmission was equipped While coating said body of a separate plate with said foamed rubber layer according to the configuration of a land prepared in said valve body, it is characterized by coating said body of a separate plate with said foamed rubber layer by width of face larger than the width of face of said land.
[0011] If only a part required for the seal of the body of a separate plate is coated with foamed rubber with a dispenser coating method or a screen coating method, since the part which coats foamed rubber will be limited only to a part required for a seal like the separate plate by claims 1 or 3 of this invention equipped with the above-mentioned configuration, or its manufacture approach, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part made into the receptacle seat to a spring, a ball, etc.
[0012] Moreover, since it is an approach suitable for a dispenser coating method or a screen coating method performing coating only to a request part among the flat surfaces for coating Foamed rubber is coated after press working of sheet metal by these approaches (after carrying out press working of sheet metal of the ingredient steel plate and considering as the product configuration as a body of a separate plate). the predetermined part of this body of a separate plate -- foamed rubber -- coating -- Or foamed rubber is coated so that foamed rubber may not start a press end face (press cutting plane) (on the flat surface of an ingredient steel plate). After coating only a predetermined part with foamed rubber so that foamed rubber may not start the part which serves as a press end face (press cutting plane) behind (after) press working of sheet metal of this ingredient steel plate is carried out, and it considers as the product configuration as a body of a separate plate -- things enable it to prevent that rubber weld flash

occurs at the time of press working of sheet metal of an ingredient steel plate.
[0013] moreover, like the separate plate by claims 2 or 4 of this invention equipped with the above-mentioned configuration, or its manufacture approach If the body of a separate plate is coated with a foamed rubber layer according to the configuration (land configuration) of a land prepared in the valve body Since the part which coats foamed rubber is limited to the part according to the configuration of a land, i.e., a part required for a seal, foamed rubber will be put on a seal garbage from the beginning of manufacture including the part too made into the receptacle seat to a spring, a ball, etc. A land is the convex contact section thru/or the convex press section to the separate plate beforehand prepared in a valve body thru/or its housing.
[0014] Moreover, it combines, and since coating of the foamed rubber layer is carried out to the body of a separate plate in the separate plate by these claims 2 or 4, or its manufacture approach by width of face larger than the width of face (land width) of a land, rubber thickness of a part which a land contacts can be made into homogeneity. Therefore, local concentration of planar pressure is avoidable, and by preparing outside the part which is not concluded by the valve body (housing), the flow to the outside of conclusion rubber can be suppressed and it becomes possible destruction of a rubber layer, and to overflow and to prevent peeling etc. Moreover, the climax part of the rubber of the part which is not put between a valve body (housing) at it and coincidence does so the operation which closes a leak path, and it becomes possible to raise the seal engine performance of it by this therefore.
[0015]
[Embodiment of the Invention] The operation gestalt of this invention is explained according to a drawing below.
[0016] Drawing 1 shows the flat surface of the separate plate (it is also called the gasket for valve bodies) 1 concerning the operation gestalt concerned, and the important section enlarged section is shown in drawing 2 . Moreover, drawing 3 is the sectional view of a wearing condition.
[0017] The separate plate 1 concerning the operation gestalt concerned As it first has the flat-surface layout fundamental as that with which the valve body 21 (refer to drawing 3) of an automatic transmission is equipped as shown in drawing 1 , and shown in drawing 2 The foamed rubber layer 3 is put on vertical both sides of the body 2 of a separate plate made from steel materials as a sealing layer, respectively. Only within partial (seal need part) 2A required for the seal of the body 2 of a separate plate, coating of this foamed rubber layer 3 is carried out by the dispenser coating method or the screen coating method. Therefore, no coating of the foamed rubber layer 3 is carried out to seal garbage 2B from the beginning of manufacture including the part which functions as a receptacle seat which receives the spring of an accumulator, or the ball of a ball check valve, but this seal garbage 2B is set to perfect surface exposure partial 2a from the beginning.
[0018] As shown in drawing 3 , the valve body 21 equipped with the separate plate 1 is divided into two upper and lower sides, has the up-and-down housing 22 and 23, and is formed in the inferior surface of tongue of the top housing 22, and the top face of the bottom housing 23 oilway 22a which circulates oil pressure, and in the shape of a 23a fang furrow, respectively. Therefore, the separate plate 1 will be put between the inferior surface of tongue of the top housing 22 which serves as a convex of duality by formation of these oilways 22a and 23a, and the top face of the bottom housing 23, and the part which contacts the inferior surface of tongue of the top housing 22 or the top face of the bottom housing 23 in vertical each side of the separate plate 1 is set to seal need partial 2A. Therefore, the above-mentioned foamed rubber layer 3 will be formed with the layout substantially reversed to the layout of Oilways 22a and 23a. Moreover, with the top housing 22 and the bottom housing 23, since it is general that the layouts of Oilways 22a and 23a differ mutually, superficial layouts will differ in the foamed rubber layer 3 by which coating is carried out to the top face of the body 2 of a separate plate, and the foamed rubber layer 3 by which coating is carried out to an inferior surface of tongue.
[0019] Many cellular rooms (it is also called cellular space) 4 are formed in the interior of the foamed rubber layer 3, respectively, and the foamed rubber layer 3 is especially equipped with big elasticity thru/or stretch nature by existence of this cellular room 4.
[0020] It faces manufacturing the separate plate 1 of the above-mentioned configuration. The

body 2 of a separate plate is alone pierced by the press to a product configuration. After this press working of sheet metal [whether only seal need partial 2A is coated with the foamed rubber layer 3 with a dispenser coating method or a screen coating method, and] The part which becomes seal need partial 2A of the separate plate 1 on the contrary behind (after) among the steel plates which form the body 2 of a separate plate is coated with the foamed rubber layer 3 with a dispenser coating method or a screen coating method. Or after this coating It carries out whether said steel plate is pierced with a press to a product configuration, and especially in the case of the latter, it takes care so that the foamed rubber layer 3 may not start the press end face which serves as the periphery section of the separate plate 1, or the hole periphery section at the time of coating.

[0021] The dispenser coating method which coats the foamed rubber layer 3 only within seal need partial 2A of the body 2 of a separate plate performs coating to seal need partial 2A of the body 2 of a separate plate using a dispenser system. When it has the basic configuration of a tank 32, the regurgitation bulb 33, and controller 34 grade and uses this by this invention, this dispenser system 31 covers predetermined width of face and predetermined height, and carries out the regurgitation of nozzle 33a at bulb 33 tip to the foamed rubber to band-like, so that it may illustrate to drawing 4 .

[0022] Moreover, a screen coating method performs coating to seal need partial 2A, where a screen is set as seal garbage 2B of the body 2 of a separate plate, and any approach is an approach suitable for performing coating only to a request part among the flat surfaces for coating, and it has the description that the coating activity is easy.

[0023] The separate plate 1 and its manufacture approach of the above-mentioned configuration do the following operation effectiveness so.

[0024] That is, since no coating of the foamed rubber layer 3 is first carried out in the first place from the beginning of manufacture at seal garbage 2B of the body 2 of a separate plate, an exposure can form perfect and uniform surface exposure partial 2a. Moreover, since it is the same and rubber removal processing is unnecessary entirely about seal garbage 2B, manufacture of the separate plate 1 can be easy-ized and floor to floor time and conversion costs can be reduced.

[0025] Moreover, it can prevent that rubber weld flash occurs at the time of press working of sheet metal by coating the foamed rubber layer 3 so that the foamed rubber layer 3 may be coated after press working of sheet metal or the foamed rubber layer 3 may not start a press end face. Therefore, it can prevent that rubber weld flash flows out in a valve body 21 as a foreign matter, and causes trouble to actuation of a bulb.

[0026] Moreover, it can prevent that setting generates the foamed rubber layer 3 by bolting around the insertion hole (neither is illustrated) of the clamping bolt prepared in the separate plate 1 at the foamed rubber layer 3 when making it there be no ****. Therefore, it can prevent that slack occurs in a clamping bolt by considering setting of the foamed rubber layer 3 as a cause, and can prevent that seal nature falls by considering the slack of a clamping bolt as a cause.

[0027] Moreover, a coating activity is easy-ized by adoption of a dispenser coating method or a screen coating method, and necessary minimum width of face and coating of height become possible. Moreover, the amount of the rubber used is also stopped few. Therefore, easy-izing of manufacture and low cost-ization of a product are realizable with reduction of such the easy coating method and the easy amount of the rubber used.

[0028] The part which serves as a convex of duality by forming Oilways 22a and 23a in the inferior surface of tongue of the top housing 22 in the valve body 21 which puts the separate plate 1, and the top face of the bottom housing 23, respectively as described above If this is the so-called lands 22b and 23b as shown in drawing 5 , and based on these lands 22b and 23b, in this invention While coating of the foamed rubber layer 3 is carried out to the body 2 of a separate plate according to the configuration (a flat-surface configuration thru/or flat-surface layout configuration) of these lands 22b and 23b by the same configuration thru/or same pattern as these lands 22b and 23b Width of face w1 of these lands 22b and 23b Large width of face w2 Coating of the foamed rubber layer 3 is carried out to the body 2 of a separate plate (w1 <w2).

[0029] The difference of the width of face of lands 22b and 23b and the foamed rubber layer 3 Right-and-left one side is enough if there is 0.25mm or more by the absolute size (/(w2-w1) 2> 0.25mm). for example, the case where thickness (rubber thickness) t of the foamed rubber layer 3 is 100 micrometers -- width of face (rubber coat ****) w2 of the foamed rubber layer 3 Width of face (partner sealing-surface width of face) w1 of lands 22b and 23b 2mm (every 1mm of one side) extent -- that what is necessary is just greatly (w2-w1 **2mm) Thus, width of face w2 of the foamed rubber layer 3 Width of face w1 of lands 22b and 23b If it enlarges Since flat section (part with flat top-face or inferior surface of tongue) 3b of the center of the cross direction in the foamed rubber layer 3 is compressed by lands 22b and 23b to be shown in drawing 6 , the planar pressure by compression can equalize crosswise and, therefore, can stabilize seal nature.
[0030] Moreover, as shown in drawing 6 , the crosswise edge of the foamed rubber layer 3 overflows lands 22b and 23b into right and left, respectively. In order to be pushed on the pressure P of a sealing fluid and to press flat section 3b from right-and-left both sides instead of forming the part which is not compressed into lands 22b and 23b, these right and left overflowing, and section 3c being compressed into lands 22b and 23b, respectively this -- it will overflow and flat section 3b will support from right and left by section 3c. Therefore, even if flat section 3b is compressed by lands 22b and 23b, it does not escape crosswise recklessly, but the rubber seal section excellent in compressibility-proof is formed here. Therefore, thereby, the seal nature of the separate plate 1 concerned can be raised.
[0031] In addition, generally, as shown in drawing 5 , when, as for the cross-section configuration of the foamed rubber layer 3 by coating, this foamed rubber layer 3 has the width of face more than a certain extent, although that thickness is abbreviation homogeneity and that top face or inferior surface of tongue becomes a flat, that crosswise center section A crosswise edge on either side is formed, respectively so that the thickness may be missing from an edge and may become thin gradually, among these as described above, flat section 3b with flat top face or inferior surface of tongue does a seal operation so effectively directly. Therefore, width of face w3 of this flat 3b Width of face w1 of lands 22b and 23b By making it approximate, the seal nature of the separate plate 1 can be raised, and it is the width of face w3 of this flat section 3b. Width of face w1 of lands 22b and 23b The seal engine performance of the separate plate 1 can be further raised by setting up greatly.
[0032] Drawing 7 was the following conditions, is what compared the difference of the amount of leaks the case where width of face of the foamed rubber layer 3 is set to 3mm, and at the time of being referred to as 3.5mm, and was able to check that there was little one where width of face is larger about the amount of leaks (the especially low-pressure amount of leaks).
[0033] a test condition ... test piece: -- a foamed rubber coat article (coat **** differences [two sorts of] 3 or 3.5mm)
partner sealing-surface width-of-face (land width): -- 3mm planar pressure: -- 1.5, 2.0, and 2.5MPa seal fluid:ATF oil 1.0MPa (regularity)

[Translation done.]

* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The top view of the separate plate concerning the operation gestalt of this invention

[Drawing 2] The important section expanded sectional view of this separate plate
[Drawing 3] The important section expanded sectional view showing the wearing condition of this separate plate
[Drawing 4] The explanatory view of a dispenser system
[Drawing 5] The important section sectional view showing the condition before compressing the separate plate concerning other operation gestalten of this invention
[Drawing 6] The important section sectional view showing the condition that this separate plate was compressed
[Drawing 7] The graphical representation showing the result of a comparative study
[Drawing 8] The important section sectional view of the separate plate concerning the conventional example
[Description of Notations]
1 Separate Plate
2 Body of Separate Plate
2A Seal need part
2B Seal garbage
2a Surface exposure part
3 Foamed Rubber Layer
3b Flat section
3c Overflow and it is the section.
4 Cellular Room
21 Valve Body
22 23 Housing
22a, 23a Oilway
22b, 23b Land
31 Dispenser System
32 Tank
33 Regurgitation Bulb
33a Nozzle
34 Controller

[Translation done.]

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2.**** shows the word which can not be translated.
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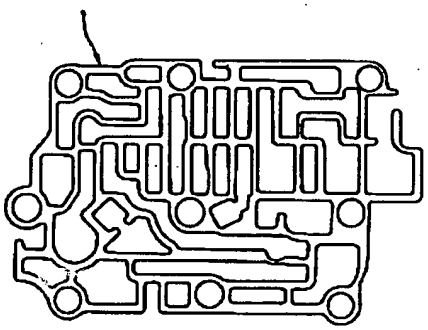
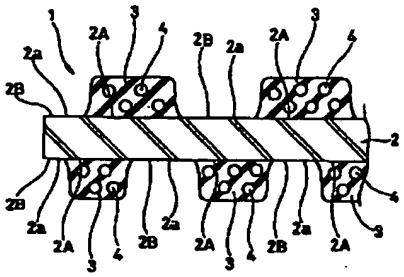
DRAWINGS

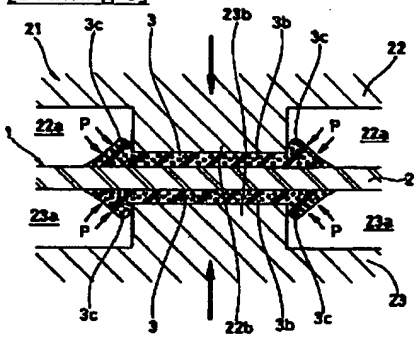
[Drawing 1]



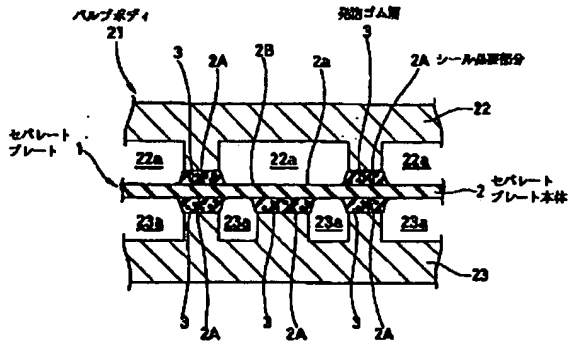
[Drawing 2]



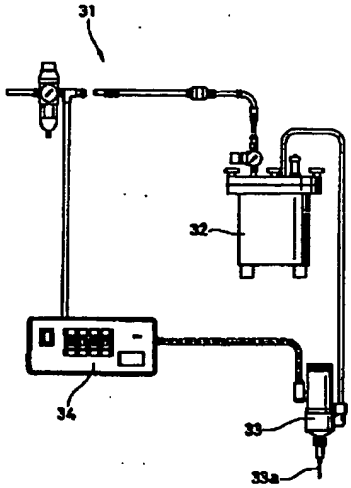
[Drawing 6]



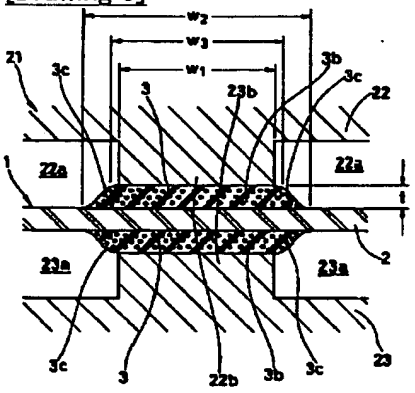
[Drawing 3]



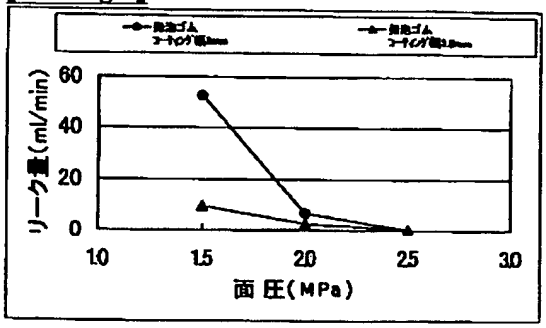
[Drawing 4]



[Drawing 5]

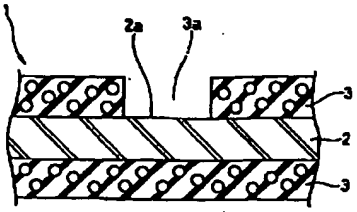


[Drawing 7]



[Drawing 8]

(USPTO)



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